REMARKS

Applicants gratefully acknowledge that the Examiner has allowed claims 5-8 and 31-34.

Claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, and 42 are currently pending in the application. Claims 1-4, 14, 29, and 30 are canceled without prejudice or disclaimer. Non-elected claims 9, 11, 13, 15, 17-28, 35, 37, 39, 41 and 43-48 are also canceled without prejudice or disclaimer. This Amendment currently amends claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, and 42. No new matter is added to currently amended claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, and 42. Claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, and 42 are currently amended to merely clarify the subject matter of the claims and in no way narrow the scope of the claims in order to overcome the prior art or for any other statutory purpose of patentability.

Notwithstanding any claim amendments of the present Amendment or those amendments that may be made later during prosecution, Applicant's intent is to encompass equivalents of all claim elements. Reconsideration in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 1, 3, 4, 10, 29, 30, 36, 38, and 42 stand rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 6,181,849 to Lin et al. (hereinafter, Lin). Claims 2, 14, and 16 stand rejected under 35 U.S.C. §103(a) as unpatentable over Lin and further in view of U.S. Patent No. 6,188,818 to Han et al. (hereinafter, Han). Claim 12 stands rejected under 35 U.S.C. §103(a) as unpatentable over Lin and further in view of U.S. Patent No. 5,901,259 to Ando et al. (hereinafter, Ando).

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

The claimed invention, as described in claim 10, is directed to *inter alia* an arrayed waveguide grating in which, central axes of selected input waveguides are displaced along a direction perpendicular to central axes of the input waveguides from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the at least one output waveguide.

The claimed invention, as described in claim 12, is directed to *inter alia* an arrayed

waveguide grating in which, central axes of selected input waveguides are inclined from a perpendicular to the surface at a focusing position to attenuate the signal lights propagated from the selected input waveguides to the at least one output waveguide.

The claimed invention, as described in claim 16, is directed to *inter alia* an arrayed waveguide grating in which, lengths, which extend from ends of selected input waveguides to light transmission points of the channel waveguide array, are displaced along propagation axes of the selected input waveguides from corresponding focusing positions to attenuate the signal lights propagated from the selected input waveguides to the light transmission points of the channel waveguide array.

The claimed invention, as described in claim 36, is directed to *inter alia* a waveguide device in which, central axes of selected input waveguides are displaced along a direction perpendicular to central axes of the input waveguides from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the output waveguide.

The claimed invention, as described in claim 38, is directed to *inter alia* a waveguide device in which, central axes of selected input waveguides are inclined from a perpendicular to the surface at a focusing position, corresponding to each of the selected input waveguides, to attenuate the signal lights propagated from the selected input waveguides to the at least one waveguide.

The claimed invention, as described in claim 40, is directed to *inter alia* a waveguide device in which, selected widths of selected input waveguides, which are axially aligned with corresponding focusing positions, comprise predetermined values to attenuate the signal lights.

The claimed invention, as described in claim 42, is directed to *inter alia* a waveguide device in which, lengths, which extend from ends of selected input waveguides are displaced along propagation axes of the selected input waveguides from corresponding focusing positions to attenuate the signal lights propagated from the plurality of input waveguides to the at least one output waveguide.

An aspect of the present invention provides an arrayed waveguide grating that adjusts

optical signal intensity outputs from respective waveguides without the need for active circuit components to compensate for attenuation differences and without the need for a highly accurate process for attaching parts.

II. THE PRIOR ART REJECTIONS

A. The Lin Reference

Fig. 7b of Lin clearly shows that the angles $\Delta\theta_i$ from input port(s) 73 are different from angles $\Delta\theta_o$ going to output ports 86, 88, and 90. This difference in angles is intended to change the spacing between the input ports of 73 and the output ports of 86, 88, and 90 in order to use the arrayed waveguide (AWG) as a router.

In this case, the angle between output ports 86 and 88, and the angle between output ports 88 and 90 are the same and equal $\Delta\theta_o$. Similarly, the distances to the focusing position, the widths, and the spacing between each of the output ports, i.e., 86, 88, and 90 are the same and fixed, in order to satisfy Equation 9 of Lin for both the second waveguide input port 74 and its corresponding waveguide output ports 86, 88, and 90 (see, col. 6, lines 41-63).

Lin discloses an interleaved waveguide grating device (WGR) with at lest two input ports and multiple output ports, in which the angles, the distances to the focusing position, the widths, and the spacing between each of the output ports are the same and fixed.

In contrast, the present invention allows a selected attenuation of a signal light to each of a correspondingly selected output port to be adjusted by varying any of the cut lengths (see, Figs. 3-6), the axial alignments (see, Figs. 7-10), the degrees of inclination from central axes of the output waveguides (see, Figs.11-13), the widths of the output waveguides (see, Figs. 14 and 15), the distances between a focusing position and an end of an output port (see, Figs. 16-18). Lin cannot produce a selected attenuation in the signal lights to correspondingly selected output ports because the aforementioned variables are the same and fixed.

With respect to claim 10, nowhere does Lin disclose, teach or suggest "wherein central axes of selected input waveguides are displaced along a direction perpendicular to central axes of said input waveguides from corresponding focusing positions by predetermined values to attenuate said signal lights propagated through said selected input waveguides to said at least one output waveguide."

With respect to claim 36, nowhere does Lin disclose, teach or suggest "wherein

central axes of selected input waveguides are displaced along a direction perpendicular to central axes of said input waveguides from corresponding focusing positions by predetermined values to attenuate said signal lights propagated through said selected input waveguides to said output waveguide."

With respect to claim 38, nowhere does Lin disclose, teach or suggest "wherein central axes of selected input waveguides are inclined from a perpendicular to said surface at a focusing position, corresponding to each of said selected input waveguides, to attenuate said signal lights propagated from said selected input waveguides to said at least one waveguide."

With respect to claim 40, nowhere does Lin disclose, teach or suggest "wherein selected widths of selected input waveguides, which are axially aligned with corresponding focusing positions, comprise predetermined values to attenuate said signal lights."

With respect to claim 42, nowhere does Lin disclose, teach or suggest "wherein lengths, which extend from ends of selected input waveguides are displaced along propagation axes of said selected input waveguides from corresponding focusing positions to attenuate said signal lights propagated from said plurality of input waveguides to said at least one output waveguide."

For at least the reasons outlined above, Applicant respectfully submits that Lin does not disclose, teach or suggest every feature in claims 10, 36, 38, 40, and 42. Accordingly, Lin does not anticipate, or render obvious, the subject matter of claims 10, 36, 38, 40, and 42. By this Amendment, claims 1, 3, 4, 29, and 30 are canceled without prejudice or disclaimer; hence, the rejection of claims 1, 3, 4, 29, and 30 is moot. Withdrawal of the rejection of claims 1, 3, 4, 29, 30, 36, 38, 40, and 42 under 35 U.S.C. §102(b) as anticipated by Lin is respectfully solicited.

B. The Han Reference

Figs. 2 and 3 of Han disclose a technique for varying loss characteristics by connecting a second slab waveguide 216 and output waveguide 218 (318) by means of a taper waveguide 317.

In contrast, the present invention allows a selected attenuation of a signal light to each

of a correspondingly selected output port to be adjusted by varying the distances between a focusing position and an end of an output port (see, Figs. 16-18). Han cannot produce a selected attenuation in the signal lights to correspondingly selected output ports according to the distance between the focusing position and an end of an output port, as recited in claim 16, because this distance does not characterize the taper waveguide 317.

Nowhere does Han teach or suggest "wherein lengths, which extend from ends of selected input waveguides to light transmission points of said channel waveguide array, are displaced along propagation axes of said selected input waveguides from corresponding focusing positions to attenuate said signal lights propagated from said selected input waveguides to said light transmission points of said channel waveguide array," as recited in claim 16.

For at least the reasons outlined above, Applicant respectfully submits that Lin and Han, either individually or in combination, do not teach or suggest every feature of claim 16. Accordingly, Lin and Han, either individually or in combination, fail to render obvious the subject matter of claim 16 under 35 U.S.C. §103(a). By this Amendment, claims 2 and 14 are canceled without prejudice or disclaimer; hence, the rejection of claims 2 and 14 is moot. Withdrawal of the rejection of claims 2, 14, and 16 under 35 U.S.C. §103(a) as unpatentable over Lin and further in view of Han is respectfully solicited.

C. The Ando Reference

Ando discloses in the background a method of eliminating polarization dependence of a planar lightwave circuit (PLC) by inserting a half waveplate consisting of a rock crystal at the center of an optical circuit of an arrayed waveguide grating-type wavelength multi/demultiplexer such that the optical principle axis of the half waveplate forms an angle of 45° with a substrate (col. 2, lines 30-35). Ando improves upon the invention related in the background by using an optical waveguide formed on a substrate with a polyimide waveplate (col. 5, lines 52-53). The half waveplate is inserted into a waveguide such that the optical principle axis of the half waveplate makes an angle of 45° with a waveguide substrate (col. 5, lines 59-62).

Fig. 11 of Ando illustrates an exemplary placement of a polyimide half waveplate 3 between an input waveguide 1 and an output waveguide 2 (col. 22, lines 50-52).

In contrast, the present invention allows a selected attenuation of a signal light to each of a correspondingly selected output port to be adjusted by varying the degree of inclination from central axes of the output waveguides (see, Figs.11-13). Ando cannot produce a selected attenuation in the signal lights to correspondingly selected output ports according to the degree of inclination from central axes of the output waveguides because the half waveplate of Ando is not characterized by degrees of inclination from central axes of the output waveguides.

As argued above, nowhere does Lin teach or suggest, "wherein central axes of selected input waveguides are inclined from a perpendicular to said surface at a focusing position to attenuate said signal lights propagated from said selected input waveguides to said at least one output waveguide," as recited in claim 12.

Similarly, nowhere does Ando teach or suggest, "wherein central axes of selected input waveguides are inclined from a perpendicular to said surface at a focusing position to attenuate said signal lights propagated from said selected input waveguides to said at least one output waveguide," as recited in claim 12.

For at least the reasons outlined above, Applicant respectfully submits that Lin and Ando, either individually or in combination, do not teach or suggest every feature of claim 12. Accordingly, Lin and Ando, either individually or in combination, fail to render obvious the subject matter of claim 12 under 35 U.S.C. §103(a). Withdrawal of the rejection of claim 12 under 35 U.S.C. §103(a) over Lin and further in view of Aldo is respectfully solicited.

III. CONCLUSION

In view of the foregoing, Applicant submits that claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, and 42, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 1/22/03

Peter A. Balnave
Reg. No. 46,199

McGinn & Gibb, PLLC
8321 Old Courthouse Road
Vienna, Virginia 22182-3817
(703) 761-4100
Customer No. 21254